648
extra

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project | Date | Author

RMD

TITLE

THE 1940 FOREST INSECT SURVEY OF YOSEMITE NATIONAL PARK

Annex 1
SB
763
C2 Y6
1940
C.1

By
J. E. Patterson
Berkeley, California
February 19, 1941

U. S. GOVERNMENT PRINTING OFFICE 8—9742

SUBJECT—

INDEX NO.—

Forest Insect Laboratory
Berkeley, California
February 19, 1941

THE 1940 FOREST INSECT SURVEY OF YOSEMITE NATIONAL PARK

APPROVED BY:

J. M. MILLER
Senior Entomologist, In Charge

SUBMITTED BY:

J. E. PATTERSON
Associate Entomologist

THE 1940 FOREST INSECT SURVEY OF YOSEMITE NATIONAL PARK

INTRODUCTION

The 1940 forest insect survey of the Yosemite National Park was made by staff members of the Forest Insect Laboratory, Berkeley, California during the period September 1 to 20, 1940. Those participating in the field work included J. M. Miller, C. R. Struble, E. C. List, Noel Street, and J. E. Patterson. Miller, Struble, and Street completed the survey of that section of the Park known as the Big Tree Grant, or Mariposa Grove. Struble, Street, and List surveyed the permanent sample plot at Aspen Valley, while Patterson made the extensive surveys and the examination of special areas reported upon.

In the following report, that section dealing with the Mariposa Grove area was written by Struble. Patterson is responsible for the interpretation of the other field data and the general extimates, as well as the recommendations dealing with subsequent protection.

SCOPE AND LIMITATIONS OF THE SURVEY

The scope of the survey was intended to include as much of the timbered areas of the park as time and facilities would permit. The prime objective was to locate and examine all areas where increased insect infestations demanded early, or immediate, control measures. The survey was necessarily limited to a general reconnaissance of the greater portion of the transition zone forests, with a brief examination of the lodgepole pine recreational areas. Briefly, the survey was restricted to the drainage of the South Fork of the Tuolumne River, Big Meadows, Yosemite Valley, the Wawona road strip, and the Mariposa Grove area in the transition zone, and Bridal Veil-Glacier Point extension, and Tioga Road-Tuolumne Meadows in the lodgepole type forests. The Mariposa Grove Area was surveyed by the continuous strip method which resulted in a 24% coverage. A unique system was inaugurated for this area by establishing permanently marked strips traversing the area in such a way as to bisect all sites and exposures. Annual surveys of the established strips will provide equivalent data sufficient for direct comparison of successive yearly losses. A schematic map of this system is included in the appendix of this report.

A total of 51,000 acres was covered by reconnaissance methods and surveys. Of this total area sugar pine-ponderosa pine type constituted 34,500 acres, Jeffrey pine 9,000 acres, and lodgepole pine 7,500 acres.

GENERAL INFESTATION CONDITIONS

A pronounced general decline in insect caused losses occurred during the year throughout the region surveyed. The greatest decline in infestations took place in the Jeffrey pine and lodgepole pine stands, and to a lesser degree in the sugar pine-ponderosa pine areas. This decrease was general in the former stands but irregular in the latter. Certain of these areas - Wawona Road strip, Big Meadows, and Crane Flat - continued to suffer relatively high endemic losses, principally in sugar pine, while on other areas - Mariposa Grove, Bald Mountain and Hetch Hetchy - the decline since 1939 ranged from 45 percent to 70 percent.

The trend of infestations in the Park forests during 1940 closely parallels that of adjacent infestations in both the Stanislaus and Sierra National Forests where a general reduction in all areas examined averaged 50 percent less than those of 1939.

CONDITIONS ON DEFINITE INFESTATION AREAS

No attempt was made to make a separate estimate of the year's losses on the various infestation units as set up in 1938, since the limitations of the survey precluded a breakdown of the general data into such small individual subdivisions. For this reason the current infestations are reported on broader areas, principally entire drainage basins extended to natural boundaries, or type change.

The current loss estimate for each infestation area set up is summarized in Table I in the appendix. Conditions on each of the infestation areas are given separately for each area.

Tuolumne Drainage Area

Includes the established units; Bald Mountain, Hetch hetchy, and Crane Flat. Current insect losses in this area are decidedly endemic with a consequent loss to sugar pine and ponderosa pine well below any annual loss recorded for the past ten years. Measured pine losses on the Aspen Valley plot show a reduction in losses since 1939 of 76 percent. These plot losses are fairly indicative of the extensive conditions throughout the area. The current losses, resulting principally from attacks by the western pine beetle and the mountain pine beetle, are generally uniform throughout with a slight upward trend in the newly acquired stands near Carl Inn where the recent infestation is perhaps 50 percent greater. Because of the current low state of the infestation, control work is not warranted, but the western half of the area should be closely watched to detect any changes.

Big Meadows Area

This unit comprises the drainage basin of Crane Creek and supports a heavy stand of ponderosa pine and sugar pine, merging into fir and Jeffrey pine in the higher elevations on the north. The current infestation is confined entirely to ponderosa pine and sugar pine. Both the western pine beetle and the mountain pine beetle are active in these stands, but compared with previous years their activity is very much reduced, registering a decline of about 75 percent. During 1940 the infestation was largely concentrated in the mid ranges above the meadows and was about evenly divided between ponderosa pine and sugar pine. Owing to the current endemic status control work on the entire area is not recommended. However, attention is directed to several infested trees in the road strip paralleling the new highway which may well be treated in the spring of 1941. Their removal would lessen the hazard to adjacent trees in this strip.

Yosemite Valley Area

The floor of the valley is considered a distinct and separate unit of infestation on account of its isolation and because of the intensive recreational use to which it is subjected. Dendroctonus barkbeetles have taken an annual toll in the pine stands of the valley for many years. In late years this loss has been greatly reduced as a result of constant vigilance and control work. The 1940 loss is estimated at 25 trees, which represents a reduction of 38 percent since the last previous loss. Periodic examinations throughout the coming season, followed by prompt treatment of brood trees, is recommended.

Wawona Road Area

For the purpose of this report the Tunnel, Chinquapin, Wawona Road and Wawona Basin units are considered as one area. Because the Wawona Road traverses the entire length of the area, intensive protection is desired. The timber type is largely composed of middle aged to mature ponderosa pine and sugar pine trees of large size. This type of stand is invaluable for park purposes and its conservation is highly desired. Unfortunately trees of this class are more susceptible to attack by barkbeetles. Far too many of the better specimens are killed annually. Maintenance control work has been practiced for the past 7 years in an effort to keep the losses to the minimum. These measures in the main have been successful, but they require constant vigilance and prompt action to insure the greatest success. Of this area the road strip should receive the most intensive protection because of its greater value to park visitors. The 1940 loss in this strip is estimated at 130 trees, both ponderosa pine and sugar pine. The loss is about evenly

divided between the two species, but because of the larger size of the sugar pines the volumes are greatly disproportional. An a tree basis the decline in losses since 1939 amounted to 41 percent. The current infestation is endemic, but even minimum losses should be prevented if possible. Therefore maintenance control is recommended following each attack period.

Mariposa Grove Area[1]

A 2½ percent cruise of the grove area was completed during September to determine the extent of current losses to sugar and ponderosa pine. This survey was extended to traverse the most representative parts of the area by means of strips 10 chains in width. These strips extended along the section lines[2] between sections 7 and 18, 17 and 18, and 7 and 8 as shown on the map in appendix. A short strip to include the east central area of section 7 was run for a distance of 40 chains west from the 1/4 corner between sections 7 and 8. An additional 10 chain strip was run along the trail for a distance of 2½ miles from the Grizzly Giant to the point where the Wawona trail crosses the old grove boundary. These strips will be maintained for a permanent annual survey record of this area.

In addition to the strip cruises, reconnaissance counts were made from 3 view points which allowed coverage of nearly the entire area. The points are located along high, open ridges as indicated on the map.

Only 2 ponderosa pines, killed by the western pine beetle during the 1940 summer season, occurred on the areas included in the strip surveys. All other trees affected by insects (topkilled and entirely killed) were located in the intervening areas. These were spotted by reconnaissance from the 3 view points mentioned. The following figures of the 1940 infestation, while approximate, give a fairly close estimate of the current losses.

Tree Species	Number	Average DBH	Aver. logs	Total Vol.
Sugar Pine	13	48	7	70,000
Ponderosa Pine	3	44	9	16,200
Jeffrey Pine	1	38	6	2,300

The above estimates include only the 1940 summer losses. Winter losses were not apparent at the time of the survey and it is highly doubtful if more than 50 percent of the number killed during the summer will show up later on this winter.

1/ Prepared by G. H. Struble.
2/ Tentatively established by Blister Rust Control in unsurveyed area.

A factor worth considering in the 1940 loss estimates in the grove area is the damage caused by lightning resulting in subsequent kill by insects. Four trees, including 2 large sugar pines, one large ponderosa pine and one Jeffrey pine were observed to have been struck by lightning within the year. These were quickly attacked and killed by barkbeetles.

Top infestations during 1940 were evident, but not heavy. Three ponderosa pines killed in the top, evidently by Ips confusus, were noted in the reconnaissance survey.

In comparison with previous years, the 1940 kill in the grove area can be recognized as definitely endemic, following a year in which conditions were exactly opposite. Sugar pine losses during the summer (1939) amounted to 47 trees, having a volume of 73,530 board feet. In addition there were 10 sugar pines entirely killed by overwintering infestations, having a volume of 56,520 board feet and 5 topkilled sugar pines having a volume of 54,810 board feet which were killed by active mountain pine beetle infestations later in the winter. During the late fall (1939) and spring (1940) still more trees were found, aggregating a total of around 50 overwintering trees. Thus the combined number of trees killed by summer and overwintering generations of beetles during 1939 amounted to somewhat over 100 trees having a total volume of nearly 325,000 board feet. In contrast to that, during 1940 the volume loss was reduced by nearly 73 percent and the tree loss by approximately 86 percent.

The reasons for this sudden decline may be found in control work by CCC crews administered and supervised by the National Park Service. This work was begun during November 1939 and completed in May 1940. All infested trees within the grove area were felled, peeled, and burned according to standard methods approved by the Bureau of Entomology and Plant Quarantine, Forest Insect Investigations. The thoroughness of this job is indicated by the 1940 reduction.

Even though the 1940 infestation is small, it is nevertheless a potential menace to the grove area. While all trees noted in the 1940 survey were killed by summer generations of beetles, this is not an indication that there will be no overwintering generations. For this reason, the grove should be examined periodically during the late fall, winter, and spring months. Fading trees found there should be treated promptly.

Illilouette Area

This area includes all of the Jeffrey pine stands in the Illilouette Basin. Past infestations in these stands have been sporadic, but at times attaining epidemic proportions. During the biennium 1939-1940, however, infestations of the Jeffrey pine beetle were endemic, registering a low point of the current cycle. The 1940 loss was approximately 50 percent less than that of 1939, indicating a continuous downward trend. The estimated loss for the past year is 45 trees for the entire area. No control work is recommended.

El Capitan Area

This unit consists of a small area of Jeffrey pine on the high ridge extending northward from El Capitan. The stand is not extensive, but individual trees are of large size. Mature trees highly susceptible to insect attack predominate. Very little is known of past infestations on this area. Recent losses were estimated from reconnaissance count of fading and red-top trees. The insect loss for 1939 is estimated at 40 trees, and that of 1940 at 15 trees. The latter loss is considered low for these stands. Subcortical examination of several dead trees showed that the insect most active was the Jeffrey pine beetle. Because of the low status of the current infestation no control work is recommended.

Little Yosemite Area

The area includes the upper Merced River drainage below Merced Lake. The timber type is largely Jeffrey pine, although both sugar pine and ponderosa pine occure sparingly on suitable sites. Past infestations of the Jeffrey pine beetle have at times been severe, and the result today is open scars in the forest and an accumulation of beetle killed snags and down logs. However, during the past biennium infestations have been greatly reduced. The estimated loss in 1939 amounted to 30 trees and that of 1940 was 5 trees. No immediate control work is recommended, but the area should be closely watched to detect any increase in losses.

Bridal Veil Area

The area as set up for this report includes all the lodgepole pine stands south of Yosemite Valley. There are three definitely separated stands involved: Bridal Veil Meadows, Mono Meadows, and Pot-Hole Meadows. The first known barkbeetle infestation developed in 1918 when a group of trees was attacked by Dendroctonus monticolae in Bridal Veil Meadows. This initial infestation spread during succeeding years with accumulated losses, although there has never been a real epidemic on the area comparable to the infestation in the Tuolumne region during the decade 1910 to 1920. However, a few annual infestations have been abnormally high in recent years, necessitating control action. The last control work carried out in Mono Meadows and in Pot-Hole Meadows appears to have been successful in reducing losses and has demonstrated the feasibility of protecting these stands against undue losses. The estimated loss during the last two years is placed at 120 trees in 1939 and 65 trees in 1940, a reduction of 46 percent during the last year. Further control is not recommended at this time, but developments should be closely watched.

Porcupine Flat Area

This is a small lodgepole pine area on Porcupine Creek at the crossing of the Tioga Road. The stand has been repeatedly defoliated by the lodgepole pine needleminer rendering the trees non-resistant to barkbeetle attack. The mountain pine beetle has taken a high toll in parts of the area. During the past two years this infestation has been greatly reduced through natural causes although 30 trees died in 1939 and 20 in 1940. Unfortunately most of this loss has occurred on and adjacent to the campground. Should the infestation continue, it will be highly desirable to eliminate it by direct control work.

Tuolumne Meadows Area

Includes all the lodgepole pine surrounding the meadows. Recent beetle losses have been negligible on this popular recreational area. No recommendations for the protection of these stands against insect depredations other than annual inspection is made.

SUMMARY AND RECOMMENDATIONS

A forest insect survey of the Yosemite National Park was made in September 1940 by the Bureau of Entomology and Plant Quarantine. This survey was of the extensive reconnaissance type supplemented by plot and strip cruises in special areas.

The Mariposa Grove area was given special attention because of recent high losses in sugar pine.

Recent control work has been effective in reducing infestations in the Mariposa Grove area, Wawona Road strip, Yosemite Valley, Big Meadows, and at Mono and Pot-Hole Meadows.

In general the losses attributable to insects during the past biennium have greatly declined from the previous status. The losses further declined from 35 percent to 75 percent during the past year.

Infestations in the ponderosa-sugar pine stands are largely caused by the western pine beetle and the mountain pine beetle. Infestations in Jeffrey pine are caused by the Jeffrey pine beetle. Recent losses in lodgepole pine have resulted from attacks by the mountain pine beetle.

Due to the present low state of infestations control work is recommended only on a few areas of high recreational use. The areas where maintenance control is recommended are: Mariposa Grove, Wawona Road Strip, Yosemite Valley, and the road strip in Big Meadows area.

It is highly desirable that the Park Service continue the detection surveys practiced during recent years.

TABLE I. Estimated Pine Losses per Area, 1939-1940

Area	Acres	Species	1939		1940	
			No. Trees	Volume BM	No. Trees	Volume BM
Tuolumne Drainage	18,000	SP-PP	225	450,000	120	110,000
Big Meadows	2,000	SP-PP	90	160,000	22	40,000
Yosemite Valley	2,700	SP-PP	40	50,000	25	20,000
Wawona Road	10,000	SP-PP	220	570,000	130	340,000
Mariposa Grove	2,000	SP-PP	75	350,000	25	120,000
Totals	34,700		650	1,580,000	322	630,000
Illilouette	3,000	JP	90	52,000	45	26,000
El Capitan	3,000	JP	40	24,000	15	9,000
Little Yosemite	3,000	JP	30	18,000	5	3,000
Totals	9,000		160	94,000	65	38,000
Bridal Veil	1,500	LP	120	19,200	65	10,400
Porcupine Flat	1,000	LP	30	6,000	20	4,000
Tuolumne Meadows	5,000	LP	20	2,200	15	1,600
Totals	7,500		170	27,400	100	16,000

TABLE II. Measured Plot Losses, Tuolumne Drainage, 1938-1939-1940.

Plot	Species	1938 No. Trees	1938 Volume BM	1938 Volume Acre	1939 No. Trees	1939 Volume BM	1939 Volume Acre	1940* No. Trees	1940* Volume BM	1940* Volume Acre
Aspen Valley	PP	41	33,480	105	12	24,160	75	7	2,850	9
R3-14	SP	3	13,760	43	1	6,120	20	2	4,520	14
320 acres										
Totals		44	47,240	148	13	30,280	95	9	7,370	23

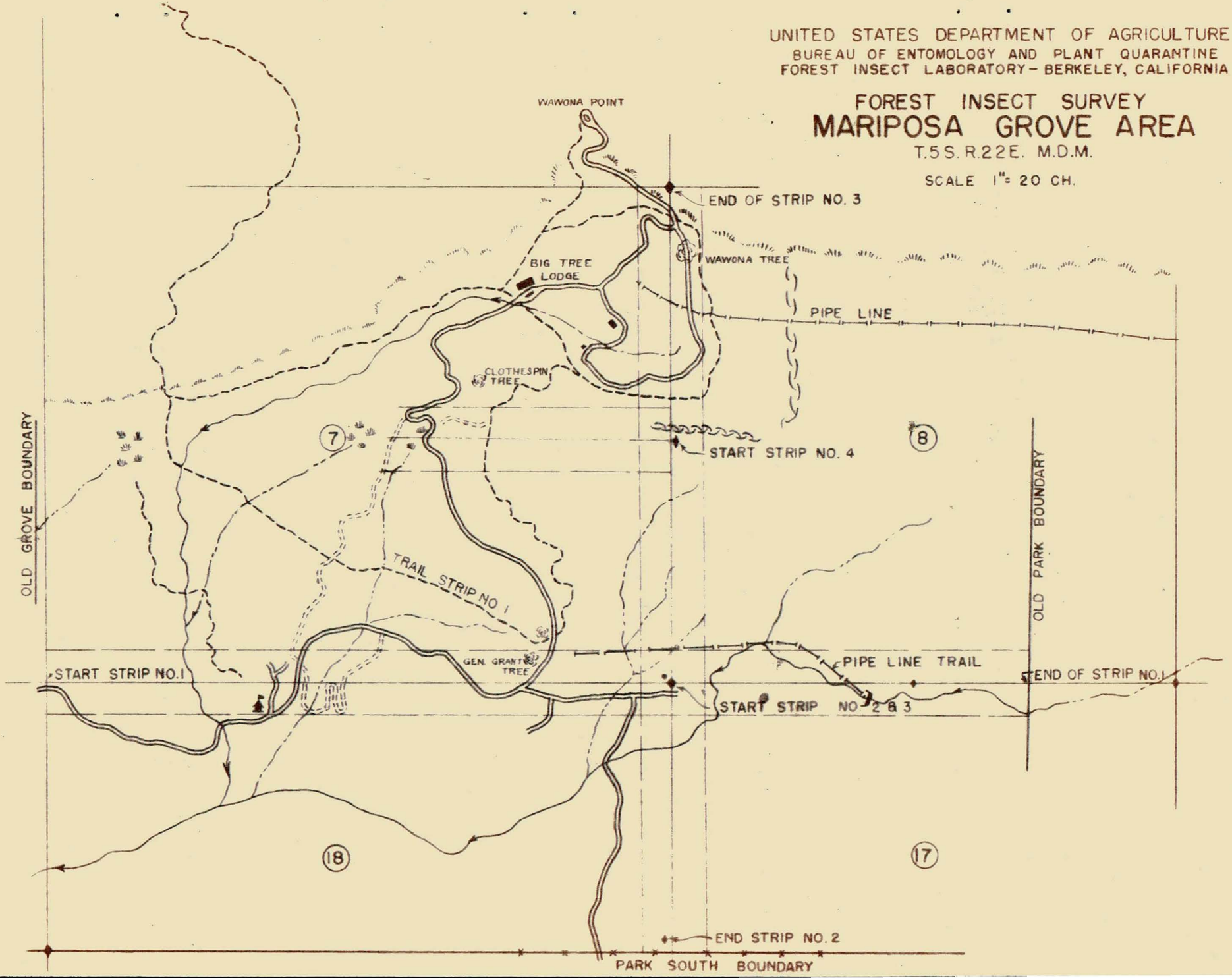
* 1940 overwintering losses are not shown. Complete losses for this year will not be available before June 1941.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT LABORATORY – BERKELEY, CALIFORNIA

FOREST INSECT SURVEY
MARIPOSA GROVE AREA

T.5S. R.22E. M.D.M.

SCALE 1" = 20 CH.



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT LABORATORY - BERKELEY, CALIFORNIA

FOREST INSECT SURVEY

STANISLAUS-YOSEMITE INFESTATION AREA

MT. DIABLO MERIDIAN, CALIFORNIA

Survey Plot - 14 (100% Cruise)

LEGEND

SCALE 0 ½ 1 2 3 4 INCHES MILES

SAMPLE PLOT

UNIT BOUNDARY

120° 00'

38° 00'

T. 3 N.

T. 2 N.

T. 1 N.

T. 1 S.

T. 2 S.

T. 3 S.

R. 16 E. R. 17 E. R. 18 E. R. 19 E. R. 20 E. R. 21 E. R. 22 E.

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT LABORATORY - BERKELEY, CALIFORNIA

FOREST INSECT SURVEY

SIERRA-YOSEMITE INFESTATION AREA

MARIPOSA AND MADERA COUNTIES, CALIFORNIA

MOUNT DIABLO MERIDIAN

SCALE 0 1 2 3 4 5 6 MILES

N

50'

40'

37° 30'

T.1S.

T.2S.

T.3S.

T.4S.

T.5S.

R.20E. R.21E. R.22E. R.23E. R.24E.

119°20'

YOSEMITE CREEK RANGER STA.
Tenaya Lake
Rafferty Pk.
TUOLUMNE CO.
MARIPOSA CO.
Yosemite Creek
PORCUPINE FLAT
ECHO CR.
Sunrise Mtn.
Creek
Indian Rock
CRANE FLAT
EL CAPITAN
YOSEMITE CREEK
TENAYA CR.
Vogelsang peak
Clouds Rest
CRANE FLAT R.S.
Cascade Creek
Boundary Hill
Basket Dome
North Dome
Eagle Peak
Half Dome
Echo
Fork
Maclure
NATL PARK
NATL FOREST
SUNRISE
RIVER
MERCED
El Capitan
Merced Lake
YOSEMITE VALLEY
Glacier Pt.
Sentinel Dome
Washburn Lake
STANISLAUS N.F.
BIG MEADOW
Bridalveil Creek
Y-3
Mt. Starr King
Mt. Clark
LAKE
DRAINAGE
Illilouette Creek
Gray Peak
Y-2
Y-1
ARCH ROCK R.S.
CHINQUAPIN R.S.
HENNESS RIDGE
SIERRA N.F.
BASHO CR.
WAWONA
Red Pk.
Edna Lake
Triple Divide Pk.
Ostrander Lake
HORSE RIDGE
MARIPOSA CO.
MADERA CO.
SOUTH FORK
Deer Camp
ROAD
Alder Creek
Chilnualna Creek
Buena Vista Pk.
RIVER
BOUNDARY LINE
MORAINE
Breeze Lake
Gale Pk.
Chain Lakes
MEADOWS
MERCED
CHILNUALNA CR.
RUSH CR.
CHOW CHILLA
Wawona Dome
CAMP A.E. WOOD
WAWONA
Redtop
Black Pk.
SOUTH FORK
NATL PARK
NATL FOREST
Devil Peak
MTNS.
BASIN
Wawona Pt.
Big Creek
RANGER STA.
Raymond Mtn.
Quartz Mtn.
Chiquito Creek
Iron Mtn.
FISH CAMP
SIERRA N.F.
MUGLER MEADOW
Speckerman Mt.
MIAMI INSECT LABORATORY
MIAMI R.S.
Fresno Dome
BEASORE MDW.

LEGEND

Unit Boundary

Sample Plot

Mariposa Grove Area - (24 % Cruise)